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Solutions to Increase Mobile Merchant Payment Applications Value, Customers' Continued Intention to Use, and Loyalty

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Abstract

The use of mobile payment applications is on the rise. There are a variety of mobile payment applications that attempt to offer value to increase the market share of merchants that provide them. However, many users are likely to stop using apps if optimal utility and customized services are not correctly delivered. This study proposes that offering context-based services that indicate customization and personalization of services will improve the perceived utility of mobile merchant payment applications and in turn, increase continued intention to use it and customer loyalty to the merchant. Our results also show that the reputation of mobile vendors significantly enhances the perceived utility of mobile merchant payment applications. The findings of this study can be valuable to researcher, merchants and mobile application developers.

Keywords: Context Awareness, Calculus Theory, Mobile Application, Mobile Payment, Utility, Personalization, Privacy, Technology Adoption.

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1. Introduction

Technology has long been recognized as an enabler of competitive advantage. In fact, competing brands often gain a competitive advantage by using technology to connect to customers to offer products and services, build loyalty and retention, lock in customers, and increase switching costs (Faulds et al., 2018). However, it is difficult to understand how customers choose to use one information system (IS) over the other to procure products and services. In the IS research community, system use is often predicted by measures of perceived ease of use and perceived usefulness. However, these IS theoretical models are commonly used to predict system use by employees within organizations. One possible way of increasing our understanding of customer behavior as they interact with IS in hyper-competitive environments, is to include the perceived value construct in IS theoretical models. The marketing literature recognizes the perceived value construct as one of the most critical measures for gaining competitive advantage (Petrick, 2002). Particularly when IS is used by external customers, in-depth learning about what customers value about IS may help guide managers on how to respond. Further, because a customer finds an IS useful or easy to use, it does not necessarily mean that the IS provides excellent value. It is quite possible that a customer who finds an IS easy to use or useful may consider it poor value if the costs of using the IS outweigh the benefits (Manis & Choi, 2019). One case of note is that of mobile payments. Mobile payments service providers in the United States face significant challenges in motivating consumers to adopt mobile payments in a retail environment. In the U.S., the mobile payments market space is highly fragmented and filled with many competitors such as Apple Pay, Samsung Pay, and PayPal. With only 37.2% of the U.S. population reporting the adoption of a mobile payment solution of some kind (Wester, 2014). To increase adoption, mobile payments must achieve higher penetration into the consumer base, for instance, providing value-added services like purchase-tracking or loyalty program integration that creates added incentives for consumers to part with old payment habits (Wester, 2014). Essentially, mobile payments providers need to offer products that add value beyond the payment and to integrate mobile payments into the overall consumer experience.

Unlike consumers in developing countries such as Kenya, proving mobile payments’ value propositions to consumers has been challenging, and it has been difficult to show how mobile payments are a more valuable payment mechanism than cash and credit cards. Little is still known about what factors will make consumers in the U.S. choose mobile payments over other payment mechanisms and other competing mobile payment providers. Traditional IS constructs, such as perceived ease of use and perceived usefulness, are just a small part of the value proposition for consumers. Thus, a greater understanding of customer’s use of IS in a retail environment is needed than what popular IS constructs, such as perceived ease of use and perceived usefulness, can provide. Since perceived value has been found to be an essential indicator of repurchase intentions in the marketing literature (Petrick, 2002), it could be applied to the IS field to determine consumers' intentions to reuse IS. Valid and reliable measures of perceived value would allow for comparison of value between competing IS applications such as mobile apps. It would allow individual apps providers to identify the dimensions of perceived value in which they perform well or poorly. Though research has focused on the business value of IS, a multi-dimensional scale for the perceived value of IS services and applications from the consumer perspective still does not exist.

Therefore, the purpose of the current study is to develop a multi-dimensional scale for the perceived value of a customer information system. We will illustrate the scale's usefulness by applying it to the mobile payments retail environment. By doing so, we will gain insight as to which factors make a mobile payment app valuable and competitive.

2. Literature Review

Although the popularity of mobile payment systems has increased in recent years, so has privacy and security concerns associated with them. Privacy has been a central issue in the adoption and use of technology-enabled products or services. Several studies have shown that greater concerns regarding information privacy, will lower the individual intentions to use online services (Belanger & Crossler, 2011). Privacy concerns also lead to less voluntary sharing of personal information via the Internet (Belanger & Crossler, 2011). However, among the stream of research on privacy, there are contradictory results. Some researchers found that unauthorized use of secondary data does not have an impact on users' perception of privacy. Therefore, it does not affect their intention to use online services (Chen & Li, 2009; Drennan et al., 2006; Brown & Muchira, 2004). This paradox has not been explained in prior privacy studies. Further, an increasing number of customers who use mobile devices to shop and pay online share their personal and account information frequently. It can be expected that they will continue to be exposed to data security issues such as identity theft, hacking, account infiltration, and other security violations in their online transactions (Warkentin & Willison, 2009). Thus, privacy and security concerns should be prioritized when selecting and designing mobile payment systems.

Before receiving any E-service from vendors, potential customers usually need to give consent for their personal data to be disclosed to vendors. This information disclosure usually ensures services to be personalized to meet customers' preferences. However, the need to collect more personal data for personalization increases the risk that privacy will be violated (Dinev et al., 2006). According to the privacy calculus theory, individuals are willing to disclose personal data if benefits associated with such behaviors exceed costs (Laufer & Wolfe, 1977). Since information disclosure is inevitable in doing business via the Internet, the theory provides some insights that researchers and practitioners can maneuver to encourage customers' share of information to create higher value in return, meanwhile enforcing security procedures to ensure privacy be protected. Prior related studies have employed the privacy calculus theory to analyze drivers for information disclosure (Zhu et al., 2017; Wang et al., 2016). These researchers found that whether customers disclose personal data depends on the utility of the personalization of online services. In another study where researchers integrated the privacy calculus theory to develop a model to predict customer loyalty of mobile hotel booking services (Ozturk et al., 2017), personalization influenced privacy concern, trust, and perceived risk, in turn, influencing customer loyalty. Being able to personalize online services to meet customers' needs with privacy and security in mind has indeed increased mobile users' willingness to exchange their personal information for receiving services. Although these studies enabled our initial understanding of the application of the privacy calculus theory in a mobile device context, little is known about key drivers for personalization and its relationship with privacy and security when evaluating a mobile payment system. Further, it is not clear that what contributes to the perceived value of the system that leads to use and generates loyal customers. In the next section, we conducted an exploratory qualitative analysis to identify factors that are critical as part of an ideal mobile payment system from customers' perspectives.

3. Concept, Construct, and Hypotheses Development

To inform the construct conceptualization, we carried out a qualitative analysis of feedback on the mobile order and payment application on the Starbucks Idea site at mystarbucksidea.com. In December 2014, Starbucks launched an updated version of the Starbucks Mobile app, which gave customers the capability to order and pay outside the store and pick up the order by skipping the line and moving straight to the counter. The site administrators asked existing users to give feedback about their experience in using the Mobile Order and Pay application and requested suggestions to improve it. To systematically review and code users' comments, we posed the following two questions:

1. What are the advantages and disadvantages of using the application?
2. What are the essential features that should be included in the application?

We used Straus and Corbin's (1990) open and axial coding procedures to identify conceptually similar themes. To develop the initial items, we analyzed these comments for the period between December 2014 and November 2016. We used NVIVO 11 to code the data. As shown in Table 1, we clustered the open codes into subcategories that were conceptually similar to form the axial codes. We used these axial codes as a basis for construct development and associated them with the extant IS literature. In most cases, the axial codes matched existing constructs in the literature. Table 1 illustrates the process of comparing the initial conceptualization derived from our data analysis to the existing literature. In total, our analysis revealed nineteen constructs that represented the essential concepts in the present context.

Construct	Examples of Open Codes From Analysis of Starbucks Ideas Forum Data and Email Interviews	Prior Literature
Fulfillment	• My drinks are always on time when I use this. However, they're also the wrong drink at least half of the time.	Parasuraman et al., 2005
Privacy	• How will my personal and banking information be handled?	Liu et al., 2005
Security	• On Christmas day someone hacked into my account, reloaded a total of $300 (in $100 increments) from the bankcard listed on my account to one of my Starbucks cards, uploaded their own Starbucks card to my account, transferred the $300 from my cards to their own, then deleted their Starbucks card from my account, effectively absconding with my $300. Merry Christmas to me.	Liu et al., 2005; Suh & Han, 2003
Trust	• You would have to trust this app and this company in ensuring your security and information will be safe.	Gefen et al., 2003
Time Awareness	• Can you adjust the app so I can have a morning, afternoon & evening drink [offer] for us frequent users	Abowd et al., 1999; C. Emmanouilidis et al., 2013
Personalization	• Based on my order history and saved favorites, you should be able to analyze my taste - what ingredients make up my favorite beverage and food - then suggest what I may like as and when you introduce something new - makes it easier for me to choose from a variety of things - and I can trust you!	Sheng et al., 2008; Sherrie et al., 2006; Arora et al., 2008
Customization	• Everything is super customizable down to how many pumps of syrup you want.	Sherrie et al., 2006; Arora et al., 2008
Activity-Based Adaptation	• It would be great to get an alert on my phone that my drink or food is ready. I can imagine walking into the store and not knowing how long it is until it is ready.	Abowd et al., 1999; C. Emmanouilidis et al., 2013
Availability	• Some drinks "aren't available at this location" comes up as an error for simple items such as a Skinny Carmel Macchiato.	Dabholkar et al., 1996; Yang et al., 2002.
Environment	• in Houston, multiple locations had to close for weather issue. The mobile app still let me place an order and charged my card. I only found out that the store was closed when I arrived to pick up my drink.	Abowd et al., 1999; C. Emmanouilidis et al., 2013
Location Awareness	• Imagine a world where you can order your morning coffee based on your location. -- Once the Starbucks app is installed and a user is within 500 feet of the set location, a verbal / visual notification pops	Abowd et al., 1999; C. Emmanouilidis et al., 2013

		up. "Would you like to order "xyz" with no whip and half fat as per usual? "Yes" says customer and verifies with a fingerprint or the voice recognition that is standard on most newer phones.	
Navigation	•	The app provided a map to the closest Starbucks where our order would be waiting (downstairs in my office building) with an estimated wait time of 4-8 minutes.	Abowd et al., 1999; C. Emmanouilidis et al., 2013
Usefulness	•	Starbucks was very crowded with high school students. I simply walked up to pick up area, said the magic words and voila! My drink was ready. That alone was enough to sell me on this feature.	Davis, 1989
Information Quality	•	You used to put the nutrition information for all your food and drinks, but I can't find it on the new app. Could you bring it back so I can make an informed choice of food/beverage that I want to consume.	Ahn et al., 2007
Functionality	•	Since the latest app update, I am unable to tip using my iPhone app. Will you be adding that feature back into the app? Also, would you consider allowing us to tip a percentage rather than a random amount?	Goodwin, 1987
Perceived Value	•	I like to get my Starbucks first thing on my lunch break, and this makes it easy to order before I even get out of work.	Hoehle & Venkatesh, 2015
Ease of Use	•	Ordering the coffee was easy enough, everything is super customizable down to how many pumps of syrup you want. You even get the calorie count of your drink.	Davis, 1989
Technical Compatibility	•	I am unable to use my phone to order. I received this invitation from Starbucks today. "3 BONUS STARS WHEN YOU MOBILE ORDER & PAY March 21, 2 p.m. – close" But I cannot order as no Mobile app exists for windows based phones. I feel I am being discriminated against and may consider using other vendors for my coffee in the future.	Premkumar et al., 1994
Universal Access	•	I love using the mobile order feature. It works in the U.S. but it won't work in Canada even though mobile ordering is available in Canada now...What's up with that?	Janda et al., 2002; Stephanidis & Savidis, 2001

Table 1: Interplay between Constructs, Codes, and Literature

Based on the codes represented in Table 1, we defined the first-order constructs in Table 2 as follows:

Construct Name	**Entity (E) to which the construct applies and General Property (GP)**	**Construct Definition**	**Source/ Reference**
Fulfillment	E = Person, GP = perception about the ability of the mobile application merchant to fulfill its promises to the user.	The degree to which the mobile application merchant fulfills its promises to the user about order delivery.	Parasuraman et al., 2005
Privacy	E = Person, GP = perception about the ability of mobile application to protect the user's privacy.	The degree to which a user perceives that his/her personal information stored in the mobile application can be accessed or viewed by unauthorized entities.	Liu et al., 2005
Security	E = Person, GP = perception about the ability of the mobile application to safeguard the user's information from criminal use or abuse.	The degree to which a user perceives that the mobile application has safeguards and policies in place to protect his/her information.	Liu et al., 2005; Suh & Han, 2003
Trust	E = Person, GP = perception about the trustworthiness of the mobile application merchant.	The degree to which a user perceives that the mobile application merchant is trustworthy.	Gefen et al., 2003

Time Awareness	E = Person, GP = perception about the ability of the application to deliver the right product/service to the right use at the right time.	The degree to which a user perceives that the mobile application delivers the right product/service to the right user at the right time.	Abowd et al., 1999; C. Emmanouilidis et al., 2013
Personalization	E = Person, GP = perception about the ability of the application to personalize contents and services.	The degree to which a user perceives that the mobile application has the ability to provide content and services that are tailored to individuals based on knowledge about their preferences and behaviors.	Sheng et al., 2008
Customization	E = Person, GP = perception about the ability of the mobile application to allow users to customize the product/service they are purchasing.	The degree to which a user perceives that he/she is able to use the mobile application to specify and modify elements of a product/service.	Arora et al., 2008
Activity-Based Adaptation	E = Person, GP = perception about the ability of mobile the application to adapt the product /service according to the user's preferences and activities.	The degree to which a user perceives that the mobile application monitors the user's activity and adapts the product/service according to the user's preferences and activities.	Abowd et al., 1999; C. Emmanouilidis et al., 2013
Availability	E = Person, GP = perception about the mobile payment service's availability.	The degree to which the product/service and the mobile payment service are available when and where the customer wants it.	Dabholkar et al., 1996; Yang et al., 2002
Environment Awareness	E = Person, GP = perception about the ability of the application to adapt the products/services according to the user's environment.	The degree to which a user perceives that the mobile application adapts the products/services according to the user's environment.	Abowd et al., 1999; C. Emmanouilidis et al., 2013
Location Awareness	E = Person, GP = perception about the ability of the application to adapt the products/services according to the user's location.	The degree to which a user perceives that the mobile application is able to locate the user and adapt the product/services according to the user's location.	Abowd et al., 1999; C. Emmanouilidis et al., 2013
Navigation Services	E = Person, GP = perception about the ability of the application to support the user's navigation according to the user's purchases.	The degree to which a user perceives that the mobile application supports the user's navigation according to the user's purchases.	Abowd et al., 1999; C. Emmanouilidis et al., 2013
Usefulness	E = Person, GP = perception about the usefulness of the mobile application in accomplishing the user's tasks.	The degree to which a person believes that using the mobile application would be useful in accomplishing his/her tasks.	Davis, 1989
Information quality	E = Person, GP = perception about the ability of the mobile application to provide relevant, timely, and accurate information.	The degree to which a user perceives that the mobile application provides relevant, timely and accurate information.	Ahn et al., 2007
Functionality	E = Person, GP = perception about whether the mobile application includes the functions needed to carry out the user's task.	The degree to which a user perceives that the mobile application includes the functions needed to carry out his/her task.	Goodwin, 1987

Perceived Value	E = Person, GP = perception about how the net value of the benefits of adopting the mobile application exceeds the costs associated with its adoption.	The degree to which a user perceives that the net value of the benefits of adopting the mobile application exceeds the costs associated with its adoption.	Nielsen et al., 2006; Nah et al., 2005; Johnson et al., 2006; Hoehle & Venkatesh, 2015
Ease of use	E = Person, GP = perception about the extent to which mobile application use is free of effort.	The degree to which a person believes that using the mobile application would be free of effort.	Davis, 1989
Technical compatibility	E = Person, GP = perception about the extent to which the mobile application is compatible with various existing mobile platforms/systems.	The degree to which a user perceives that the mobile application is compatible with various existing mobile platforms/systems.	Premkumar et al., 1994
Universal Access	E = Person, GP = perception about the accessibility of the mobile application from any location.	The degree to which a user perceives that the mobile application is globally accessible.	Janda et al., 2002

Table 2: First Order Constructs, Construct Entities and Definitions

According to the first-order variables, Table 3 displays the definitions of the three second-order constructs as follows:

Construct Name	**Entity (E) to which the construct applies and General Property (GP)**	**Construct Definition**	**Source/ Reference**
Reputation	E = Person, GP = overall perception of the ability of the mobile application merchant's reputation.	The degree to which the user perceives that the mobile application's merchant is fair and honest.	Anderson & Weitz, 1992; Hoxmeier, 2015
Context-based Services	E = Person, GP = overall perception about the ability of the mobile application to dynamically adapt its behavior according to the user's and application's context.	The degree to which the user perceives that the mobile application dynamically changes or adapts its behavior based on the context of the application and the user.	Abowd et al., 1997; Brown et al., 1997; Davis et al., 1998; Dey et al., 1997; Korteum et al., 1998; Schilit et al., 1994; Ward et al., 1997
Application Utility	E = Person, GP = overall perception about the utility of the mobile application	The degree to which a user perceives that the mobile app generally serves its purpose well.	Hoehle & Venkatesh, 2015

Table 3: Second-Order Constructs, Construct Entities and Construct Definitions

Table 4 shows that three constructs (i.e., utility, reputation, and context-based services) are conceptualized and measured as second-order formative constructs, and two dependent variables (continued intention to use and loyalty) are conceptualized and modeled as first-order reflective constructs.

Construct	**Type of construct**	**Dimensions**
App utility	Formative	Time-saving
		Convenience
		Control
		Value
		Information quality
Vendor reputation	Formative	Security

		Privacy
		Fulfillment
		Trust
Context-based services	Formative	Identity awareness
		Environment awareness
		Time awareness
		Location awareness
Continued intention to use	Reflective	5 items
Loyalty	Reflective	5 items

Table 4: Constructs and Dimensions

Using the identified constructs, we defined four hypotheses as follows:
Hypothesis 1 (H_1): There is a positive relationship between the reputation of vendors and context-based services.
Hypothesis 2 (H_2): There is a positive relationship between context-based services and perceived utility.
Hypothesis 3 (H_3): There is a positive relationship between perceived utility and continued intention to use the mobile application.
Hypothesis 4 (H_4): There is a positive relationship between perceived utility and customer loyalty.
Figure 1 shows the proposed conceptual model.

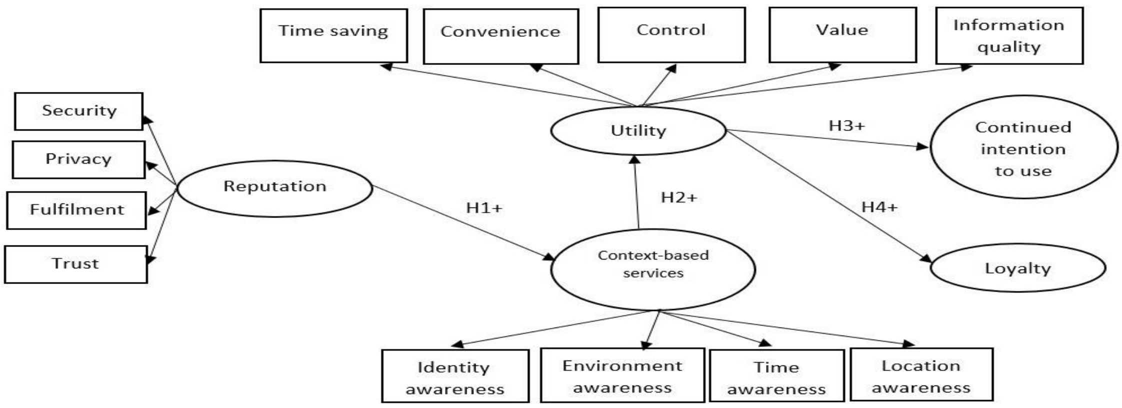

Figure 1: Conceptual Model

4. Methodology
Using Qualtrics software, we emailed the survey to 500 randomly chosen students enrolled in the evening MBA and BBA programs at a large university in the southeastern United States. After excluding responses that failed the response quality questions, the final set of useable and valid responses contained 450 samples.

5. Analysis
To validate the survey instrument, we performed a Confirmatory Factor Analysis (CFA) on all the constructs to assess the measurement model. To do so, AMOS (Version 20) was used to test convergent validity and discriminant validity. All AVEs are greater than 0.50 demonstrating convergent validity, and all values of Cronbach's Alpha and composite reliabilities are higher than the threshold value of 0.7 (Table 5), which highlights that the reliability of constructs is adequate (Segars, 1997).

Constructs	Average Variance Extracted (AVE)	Cronbach's Alpha	Composite Reliability
Reputation	0.763	0.923	0.927
Utility	0.785	0.948	0.948
Context-based services	0.637	0.872	0.870
Loyalty	0.866	0.97	0.97
Intention to use	0.866	0.97	0.97

Table 5: Convergent Validity Summary and Construct Reliabilities

We also tested the discriminant validity of the constructs (Table 6). All the diagonal values (the square roots of the AVEs) were greater than 0.7 and exceed the correlations between any pair of constructs (Fornell, Tellis, & Zinkhan, 1982). Therefore, the results indicate that the model fulfills the requirements of discriminant validity and it is assumed that the model also has adequate discriminant validity.

Constructs	Reputation	Utility	Context-based services
Reputation	**0.873**		
Utility	0.755	**0.886**	
Context-based services	0.433	0.609	**0.798**

Table 6: Correlations among Latent Constructs

The indices values for CFI= 0.922, NFI=0.90, RFI= 0.90, IFI= 0.912 and TLI=0.912 are above 0.9 and the RMR= 0.058 and RMSEA= 0.067 are below 0.08 (Byrne, 2001). The fit indices support that there is a good fit between the hypothesized model and the observed data. The path analysis result significantly supports all proposed causal relationships (Table 7). The reputation of vendors significantly influences users' perceptions of the merchant's context-awareness offerings, supporting H_1 (β= 0.651, $p < 0.001$). Offering context-based services significantly influences the levels of utility perceived from the application, validating H_2 (β= 0.806, $p < 0.001$). Perceived utility significantly increases the continued intention to use the application supporting H_3 (β= 0.462, $p < 0.001$). Utility perceptions also enhance customer loyalty to the application, validating H_4 (β= 0.432, $p < 0.001$). Figure 2 displays the standardized path coefficients of the structural model under investigation.

Path			Estimate	S.E.	C.R.	p-value
Reputation	→	Context-based services	**.651**	.039	12.179	***
Context-based services	→	Utility	**.806**	.054	15.985	***
Utility	→	Intention to Use	**.462**	.101	8.445	***
Utility	→	Loyalty	**.432**	.092	7.752	***

*** p < 0.001

Table 7: Path Analysis

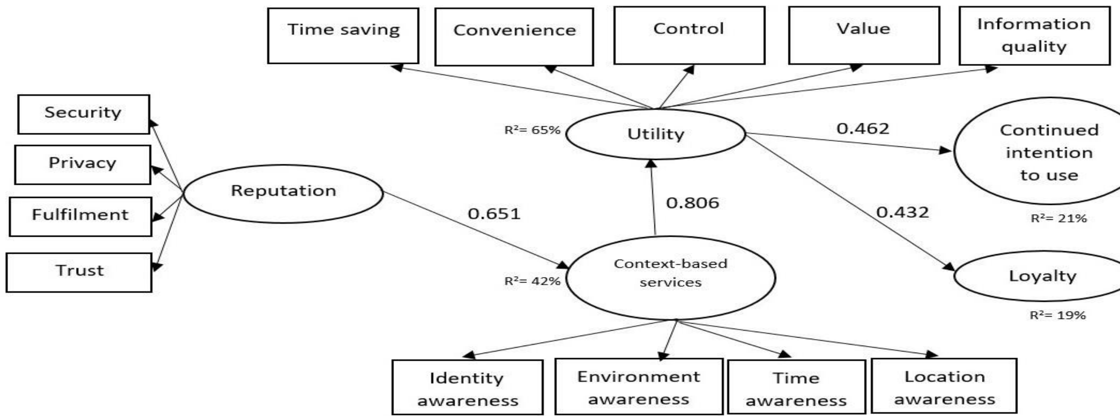

Figure 2: Path Coefficients

Overall, the proposed model can explain 65% of the variance in utility, 42% of the variance in context-based services, 21% of the total variance in users' continued intention to use a mobile application. Moreover, the model is able to predict 19% of the variance in users' loyalty to the application. These R square values show that future studies can extend this work by adding more relevant variables to enhance the explanatory power proposed by this model.

6. Discussion

The model showed that customers are more receptive to context-based services that are provided by a reputable mobile application. The context-based services (such as services offered based on time and location awareness) can lead to more perceived utility (such as time-saving and convenience). The more utility seen by users, the more willing they are to continue using the application in the future. Moreover, the perceived utility can make users loyal to the mobile app. This study demonstrated the significance of perceived security, privacy, fulfillment, and trust in vendors. Vendors should have a robust privacy policy statement, which clearly states the purposes of collecting, processing, and using customers' data. If users are aware of security safeguards, which used to protect personal data from unauthorized access and third parties, users are more likely to trust the vendor. If the measures to protect data security are robust, users will be more likely to use context-based services because they realize that their personal information is stored and processed by a reputable vendor to offer more personalized and customized services based on their context.

These customized services can bring about more convenience, value, time-saving, and perceived control. The more utility a mobile application generates, the more likely that users will continue using the application in the future. Users will also be more inclined to say positive things about the mobile app to others. This study showed that the levels of utility offered by an application could increase switching costs, enhance the functionality of the application, and finally increase the levels of customer loyalty. More importantly, our study confirmed the usefulness of the privacy calculus theory in a way that highlighted that customers would choose to continue to use mobile payment systems when the perceived utility is high.

Additionally, we expanded the theory to include other vital variables that significantly contribute to the benefits and risks of using mobile payments, such as reputation and context awareness. Path analyses yielded new insights to enrich the theory that reputation and context awareness can affect utility (for cost-benefit analysis), thus influencing customers' continued intention to use mobile payment systems and their loyalty. Our finding also filled the gap in prior related studies and found that both privacy and security have greater priorities than personalization when customers consider using mobile payment services. Moreover, we have validated and utilized multi-dimensional scales for measuring constructs and have demonstrated the usefulness of the scales in the mobile payment environment. With an increasing number of electronic hand-held gadgets and devices introduced to the market and utilized by people, future research can apply our model in other contexts to seek further validation.

7. Conclusion

Through the development of a model and an empirical study, this paper suggests that providing customization and personalization of mobile services based on customer contexts is the main competitive advantage of mobile application vendors. Context-based services can improve the utility offered by the apps, and in turn, encourage current users to continue using the apps in the future. Moreover, they will become more prone to recommend apps to other prospective customers. However, these positive use behaviors will not take place if the app vendors are not reputable in the market. Therefore, the findings demonstrate that the reputation of app vendors is the essential building block of this equation. If a reliable app vendor offers context-based services with high levels of personalization, users may see more utility. Consequently, they are more likely to use the app in the future and also encourage others to switch to it. The results of this study can contribute to both theory and practice.

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